TOTAL QUALITY MANAGEMENT
(MECH 3236)

Time Allotted : 3 hrs   **Full Marks : 70**

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

    (i)   ISO 14001 gives stress on
           (a) plan-do-check-act   (b) environmental protection
           (c) prevention rather than detection   (d) (a) , (b) and (c).

    (ii)   The success of a sampling inspection depends upon
           (a) sample size   (b) lot size
           (c) acceptance number   (d) all of the above.

    (iii) Pareto chart helps the QC Manager to
           (a) focus on the most critical issues to improve quality
           (b) determine if a process is out of control
           (c) face quality audit
           (d) focus stimulating thinking.

    (iv)   The view of quality that focuses on "fitness for use" and "user perception" is known as
           (a) transcendental view   (b) product based view
           (c) user – based view   (d) value-based view.

    (v)   To initiate total quality management, an organization must establish a culture based on
           (a) customer satisfaction   (b) continuous improvement
           (c) leadership   (d) team work.

    (vi)   Factors that lead to customer satisfaction are
           (a) commitment to customer and customer focused service standards
           (b) training and employment
           (c) effective complaint management
           (d) (a), (b) and (c).

(vii) "Quality is meeting or exceeding customer expectations".
This definition of quality is known as
(a) perceived quality (b) customer driven quality
(c) indifferent quality (d) expected quality.

(viii) The control chart for number of defects per sample is
(a) p-chart (b) np-chart
(c) C-chart (d) R-chart.

(ix) Statistical process charts are used to control
(a) assignable causes (b) chance causes
(c) differential causes (d) all of the above.

(x) When the process capability is more than the specified tolerance, the rejections are
(a) less (b) very high
(c) high (d) nil.

Group- B

2. (a) Distinguish between Quality Control and Inspection.
[(CO1)(Understand)/LOCQ)]
(b) How does "Employee Involvement" improve the quality aspects in an organization? [(CO1)(Remember/LOCQ)]
6 + 6 = 12

3. (a) Briefly explain the methods that are followed for "Customer Satisfaction "
[(CO2)(Understand/LOCQ)]
(b) Narrate briefly the necessity of "Customer Retention" in an established organization. [(CO1)(Remember)/LOCQ]
6 + 6 = 12

Group - C

4. Quality Policy of XYZ Ltd. reads "We continually improve product quality, environmental, social and safety performance, work environment and services through setting and reviewing objectives, employee education & involvement and upgradation of skill, knowledge, technology through participation of all." As an auditor you want to check if XYZ Ltd. is adhering to the policy. Prepare a list of parameters that are spoken in the abovementioned policy and also prepare a questionnaire for the MR of the organisation to ascertain that the policy is sufficiently adhered to.
[(CO5)(Evaluate/HOCQ)]
12

5. (a) What are the management responsibilities as per ISO 9001:1994 version?
[(CO5)(Remember/IOCQ)]

(b) What is ISO 14001 standard? What are the mandatory environmental parameters that must be displayed in Thermal Power Plant?

[(CO5)(Remember/LOCQ)]

6 + 6 = 12

Group - D

6. (a) Explain the following QC tools used for improving the quality of an organization: (i) Pareto Analysis (ii) Cause and Effect Diagram (iii) Scatter Diagram.

[(CO2)(Analyze/IOCQ)]

(b) Illustrate the characteristics of Quality Circles as a management tool for improving quality. [(CO2)(Understand/LOCQ)]

6 + 6 =12

7. (a) Mention briefly the elements that are associated with the 5-S principles to implement "Kaizen". [(CO2)(Remember/IOCQ)]

(b) Mention the advantages of QFD. [(CO3)(Understand/IOCQ)]

6 + 6 = 12

Group - E

8. (a) Outline the concept of Six-Sigma Process Capability.

[(CO6)(Remember/HOCQ)]

(b) A drilling machine bores holes with a mean diameter of 0.523cm and a standard deviation of 0.0032 cm. Calculate the 2-sigma and 3-sigma upper and lower control limits for means of sample of 4. [(CO5)(Evaluate/HOCQ)]

6 + 6 = 12

9. (a) When would you use the following control charts?
(i) Number defective chart (ii) Fraction defective chart (iii) Defect chart.

[(CO5)(Remember/HOCQ)]

(b) Ten wall clocks were inspected to locate defects in them. Each piece was having some defects and these are mentioned in the following table. Draw a C-chart to arrive at conclusions.

Wall Clocks	1	2	3	4	5	6	7	8	9	10
No. of defects in the clock	2	3	1	4	3	4	5	0	2	3

[(CO5)(Evaluate/HOCQ)]

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	37.5	25	37.5

CO 1 Define and measure Quality, distinguish between Quality Control and Quality Assurance

CO 2 Explain various quality control tools and their uses to improve quality

CO 3 Differentiate between product quality and system quality, awareness of various ISO 9000 system standard

CO 4 Understand the importance of ISO 14000 environment management system and its implication

CO 5 Apply various quality control charts, operating characteristics curve for quality improvement

CO 6 Define process capability, apply the principles of design of experiments, Taguchi Methodology and six sigma

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question